FIG. 1

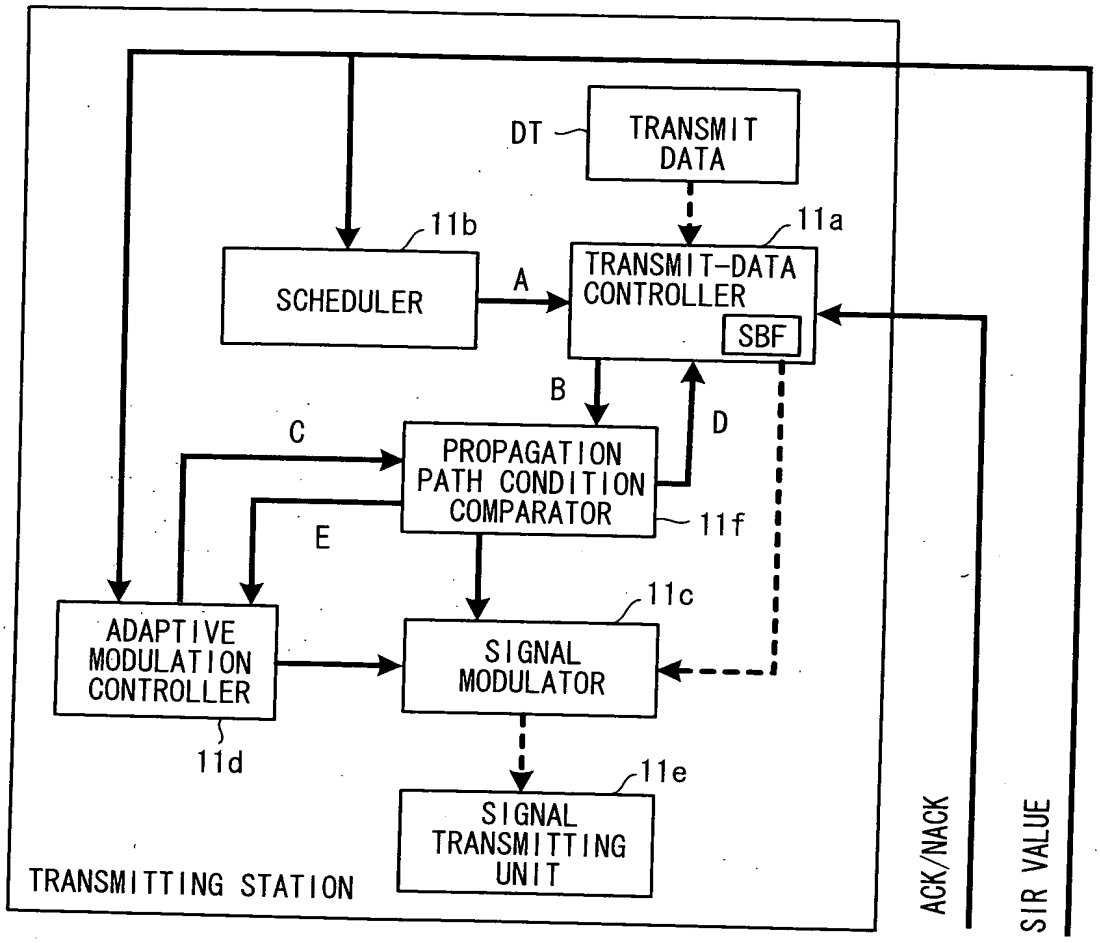
DT
TRANSMIT DATA
11b
11a
SCHEDULER
A
TRANSMIT-DATA CONTROLLER
SBF
B
D
C
PROPAGATION PATH CONDITION COMPARATOR
11f
E
11c
ADAPTIVE MODULATION CONTROLLER
SIGNAL MODULATOR
11d
11e
SIGNAL TRANSMITTING UNIT
TRANSMITTING STATION
ACK/NACK
SIR VALUE

FIG. 2

USER	PACKET NO.	MODULATION PARAMETER	PACKET DATA
USER 1	P11	16QAM	...
	P12	4QAM (QPSK)	...
	...	...	...
USER 2	P21	...	...
	P22	...	...
	...	...	...
⋮	⋮	⋮	⋮

FIG. 3

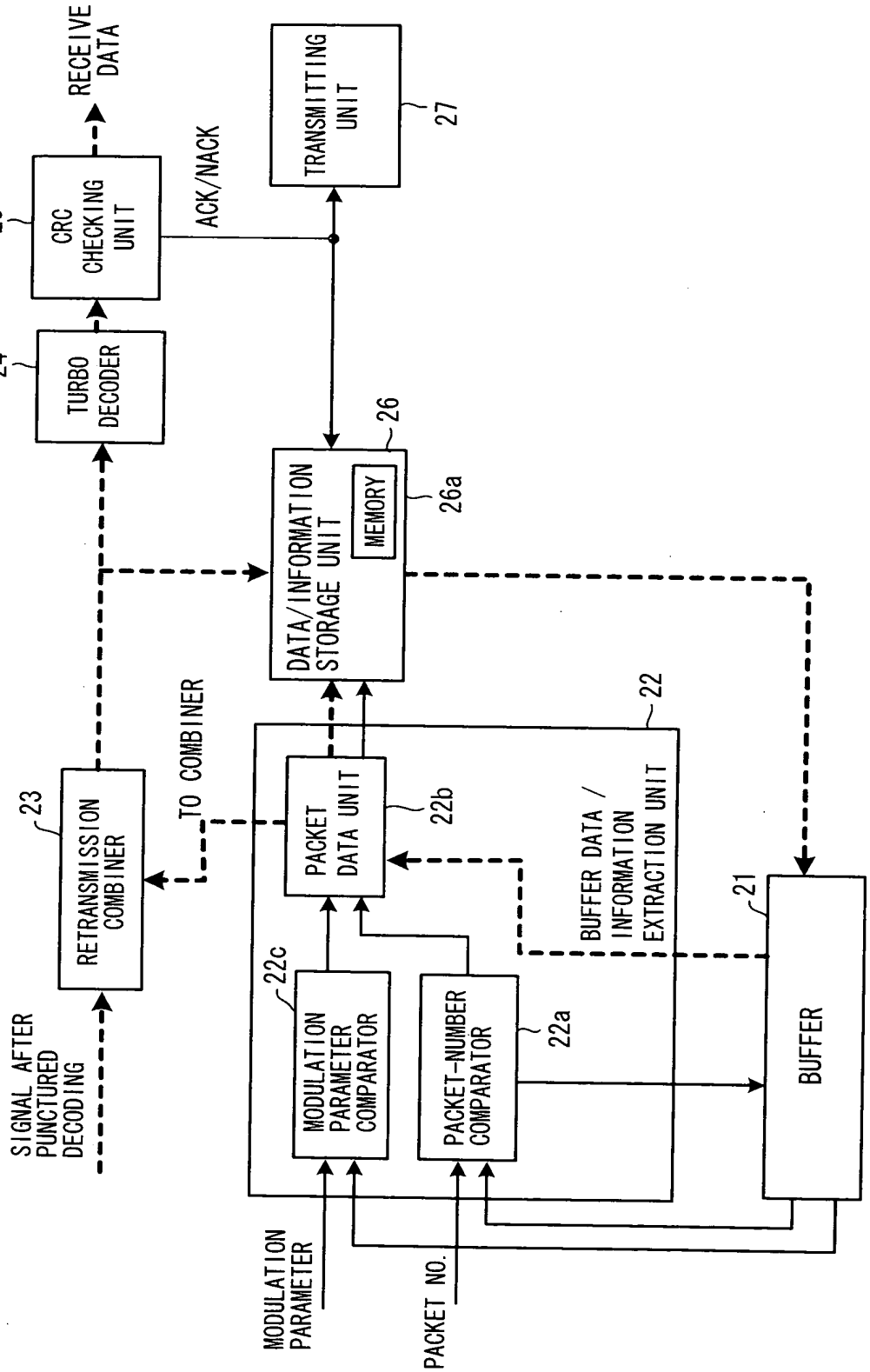
RECEIVE DATA
25
CRC CHECKING UNIT
ACK/NACK
TRANSMITTING UNIT
27
24
TURBO DECODER
26
DATA/INFORMATION STORAGE UNIT
MEMORY
26a
23
RETRANSMISSION COMBINER
TO COMBINER
PACKET DATA UNIT
22b
22
BUFFER DATA / INFORMATION EXTRACTION UNIT
21
22c
MODULATION PARAMETER COMPARATOR
PACKET-NUMBER COMPARATOR
22a
BUFFER
SIGNAL AFTER PUNCTURED DECODING
MODULATION PARAMETER
PACKET NO.

FIG. 4

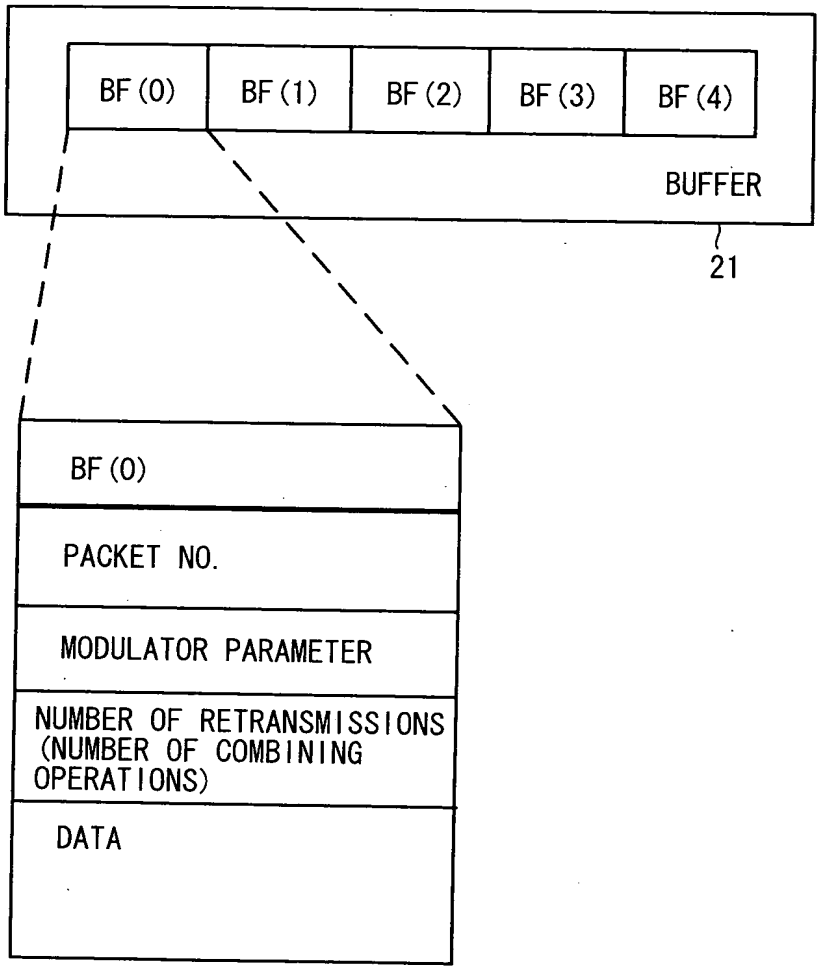
BF (0)
BF (1)
BF (2)
BF (3)
BF (4)
BUFFER
21
BF (0)
PACKET NO.
MODULATOR PARAMETER
NUMBER OF RETRANSMISSIONS (NUMBER OF COMBINING OPERATIONS)
DATA

FIG. 5

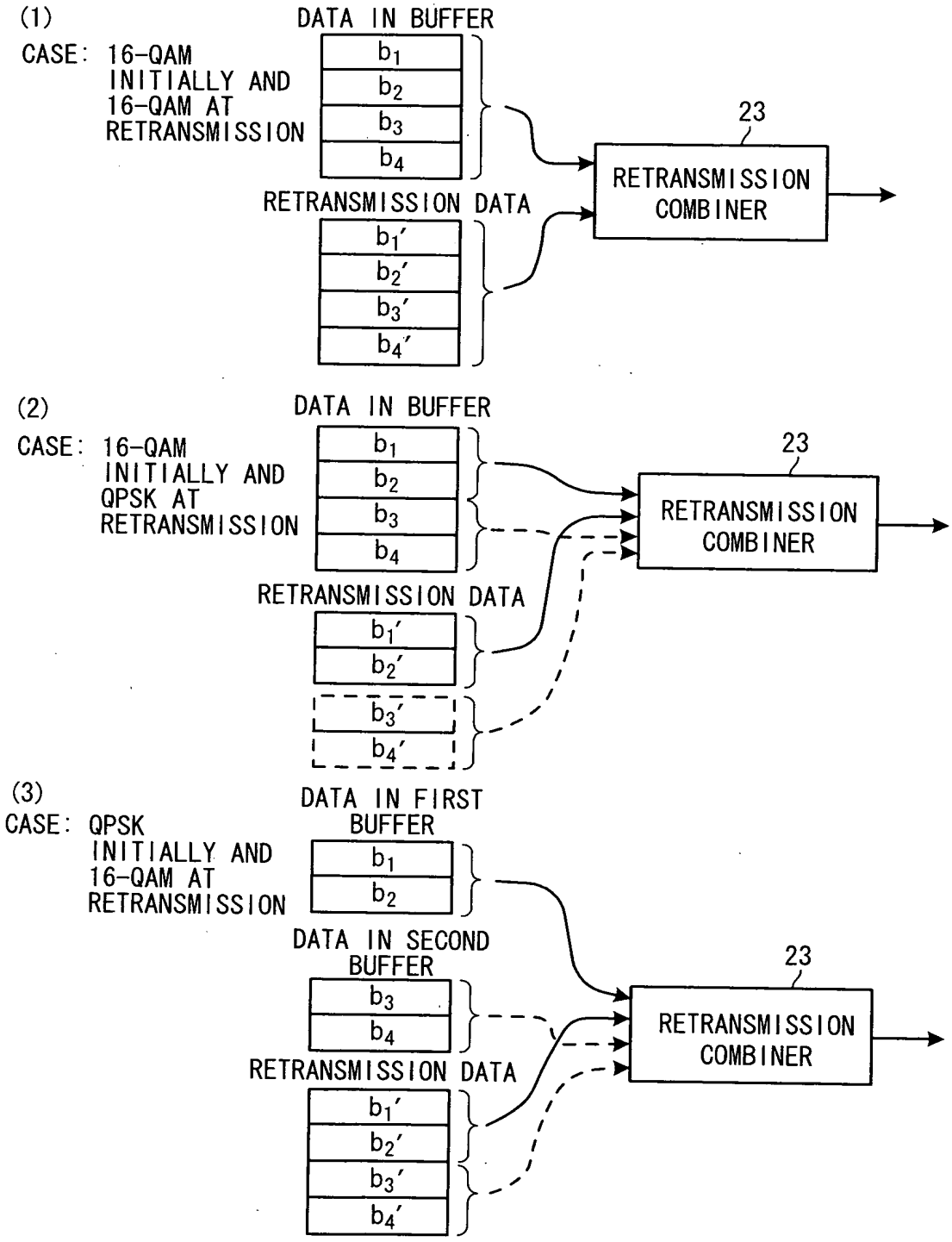
(1)
CASE: 16-QAM INITIALLY AND 16-QAM AT RETRANSMISSION
DATA IN BUFFER
b1
b2
b3
b4
RETRANSMISSION DATA
b1′
b2′
b3′
b4′
23
RETRANSMISSION COMBINER
(2)
CASE: 16-QAM INITIALLY AND QPSK AT RETRANSMISSION
DATA IN BUFFER
b1
b2
b3
b4
RETRANSMISSION DATA
b1′
b2′
b3′
b4′
23
RETRANSMISSION COMBINER
(3)
CASE: QPSK INITIALLY AND 16-QAM AT RETRANSMISSION
DATA IN FIRST BUFFER
b1
b2
DATA IN SECOND BUFFER
b3
b4
RETRANSMISSION DATA
b1′
b2′
b3′
b4′
23
RETRANSMISSION COMBINER

FIG. 6

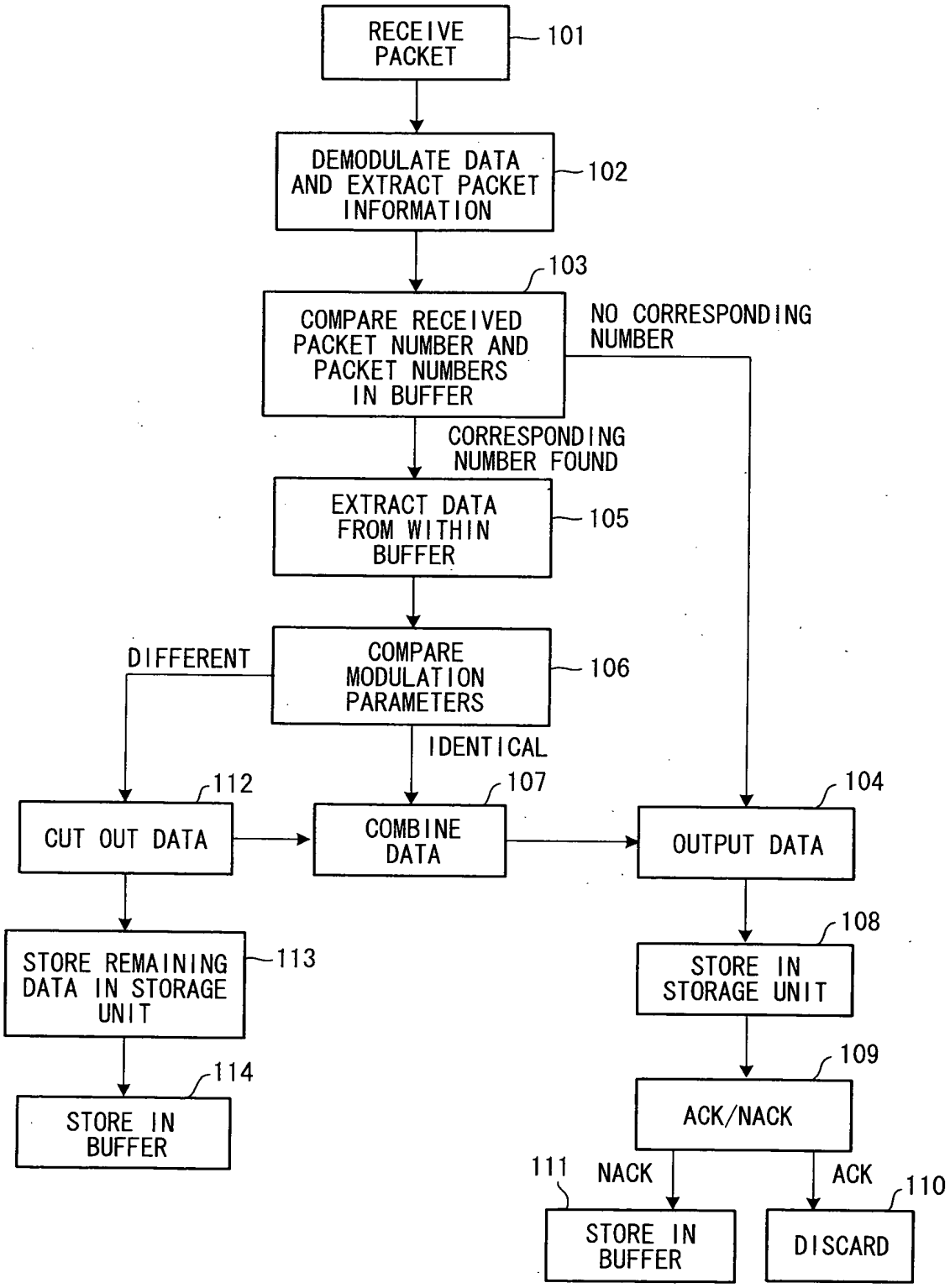
RECEIVE PACKET
101
DEMODULATE DATA AND EXTRACT PACKET INFORMATION
102
103
COMPARE RECEIVED PACKET NUMBER AND PACKET NUMBERS IN BUFFER
NO CORRESPONDING NUMBER
CORRESPONDING NUMBER FOUND
EXTRACT DATA FROM WITHIN BUFFER
105
DIFFERENT
COMPARE MODULATION PARAMETERS
106
IDENTICAL
112
107
104
CUT OUT DATA
COMBINE DATA
OUTPUT DATA
108
STORE REMAINING DATA IN STORAGE UNIT
113
STORE IN STORAGE UNIT
109
114
ACK/NACK
111
NACK
ACK
110
STORE IN BUFFER
STORE IN BUFFER
DISCARD

FIG. 7

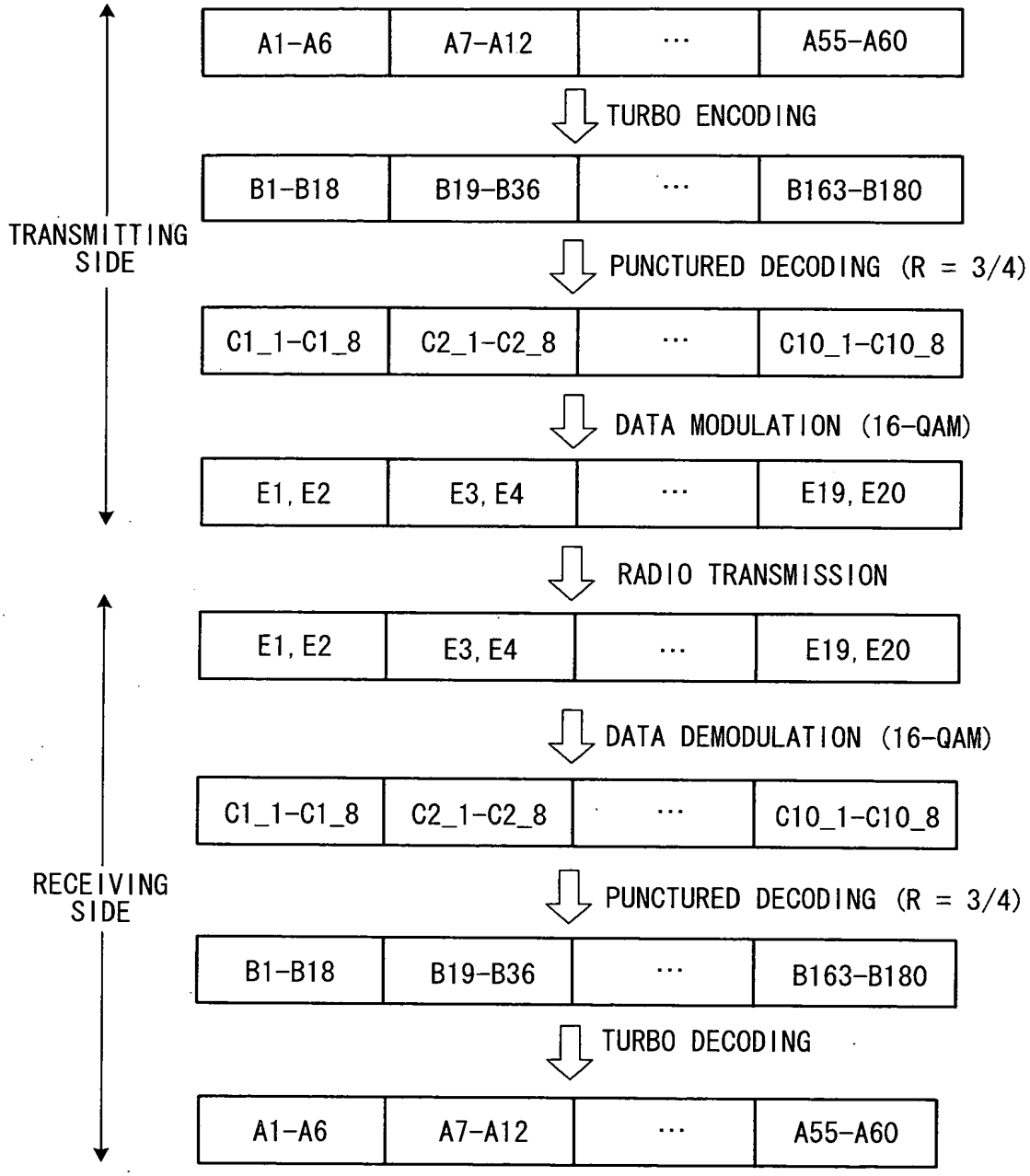
TRANSMITTING SIDE
A1-A6
A7-A12
···
A55-A60
TURBO ENCODING
B1-B18
B19-B36
···
B163-B180
PUNCTURED DECODING (R = 3/4)
C1_1-C1_8
C2_1-C2_8
···
C10_1-C10_8
DATA MODULATION (16-QAM)
E1, E2
E3, E4
···
E19, E20
RADIO TRANSMISSION
E1, E2
E3, E4
···
E19, E20
DATA DEMODULATION (16-QAM)
C1_1-C1_8
C2_1-C2_8
···
C10_1-C10_8
RECEIVING SIDE
PUNCTURED DECODING (R = 3/4)
B1-B18
B19-B36
···
B163-B180
TURBO DECODING
A1-A6
A7-A12
···
A55-A60

FIG. 8

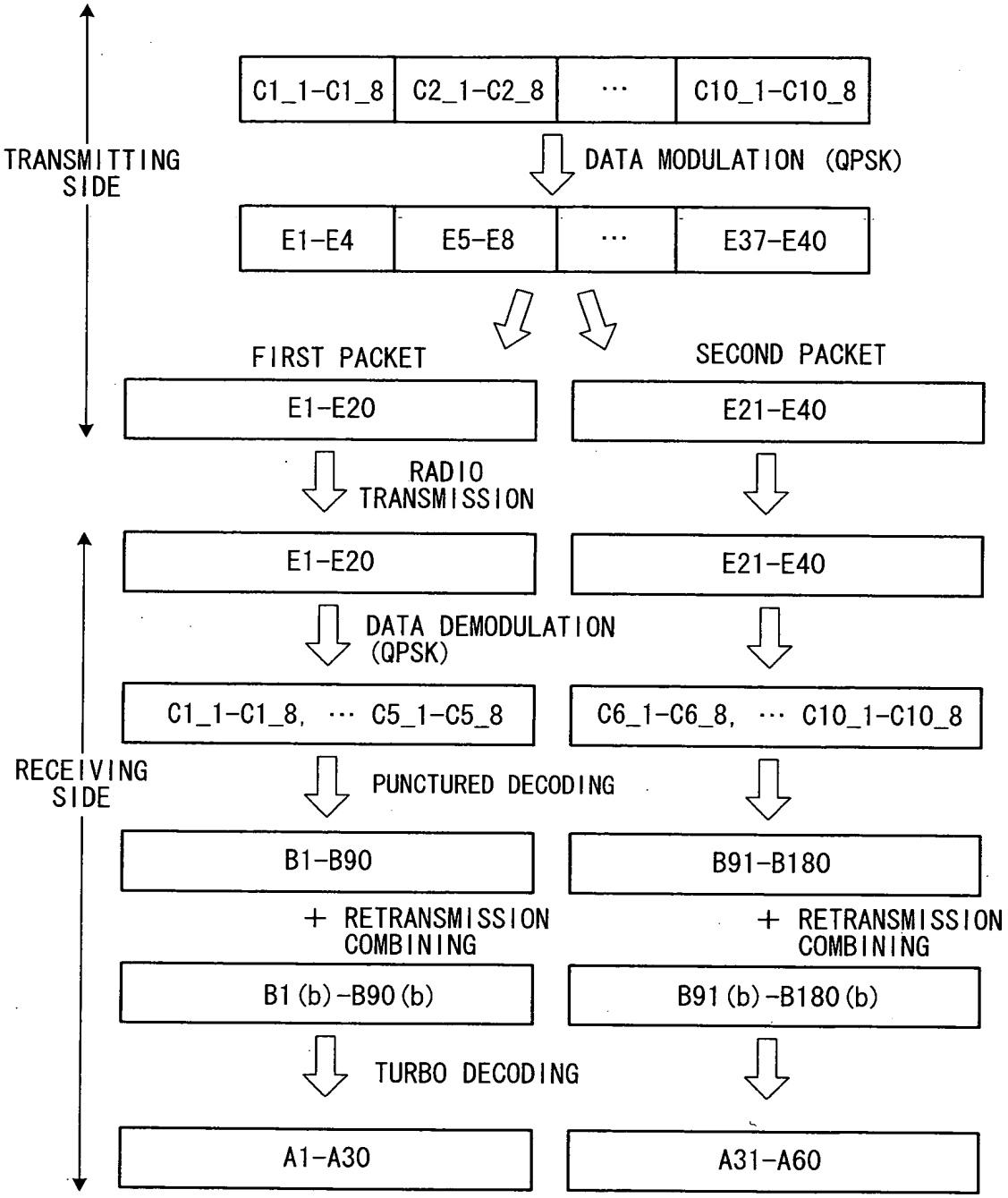
TRANSMITTING SIDE
C1_1-C1_8
C2_1-C2_8
···
C10_1-C10_8
DATA MODULATION (QPSK)
E1-E4
E5-E8
···
E37-E40
FIRST PACKET
SECOND PACKET
E1-E20
E21-E40
RADIO TRANSMISSION
E1-E20
E21-E40
DATA DEMODULATION (QPSK)
C1_1-C1_8, ··· C5_1-C5_8
C6_1-C6_8, ··· C10_1-C10_8
RECEIVING SIDE
PUNCTURED DECODING
B1-B90
B91-B180
+ RETRANSMISSION COMBINING
+ RETRANSMISSION COMBINING
B1(b)-B90(b)
B91(b)-B180(b)
TURBO DECODING
A1-A30
A31-A60

FIG. 9

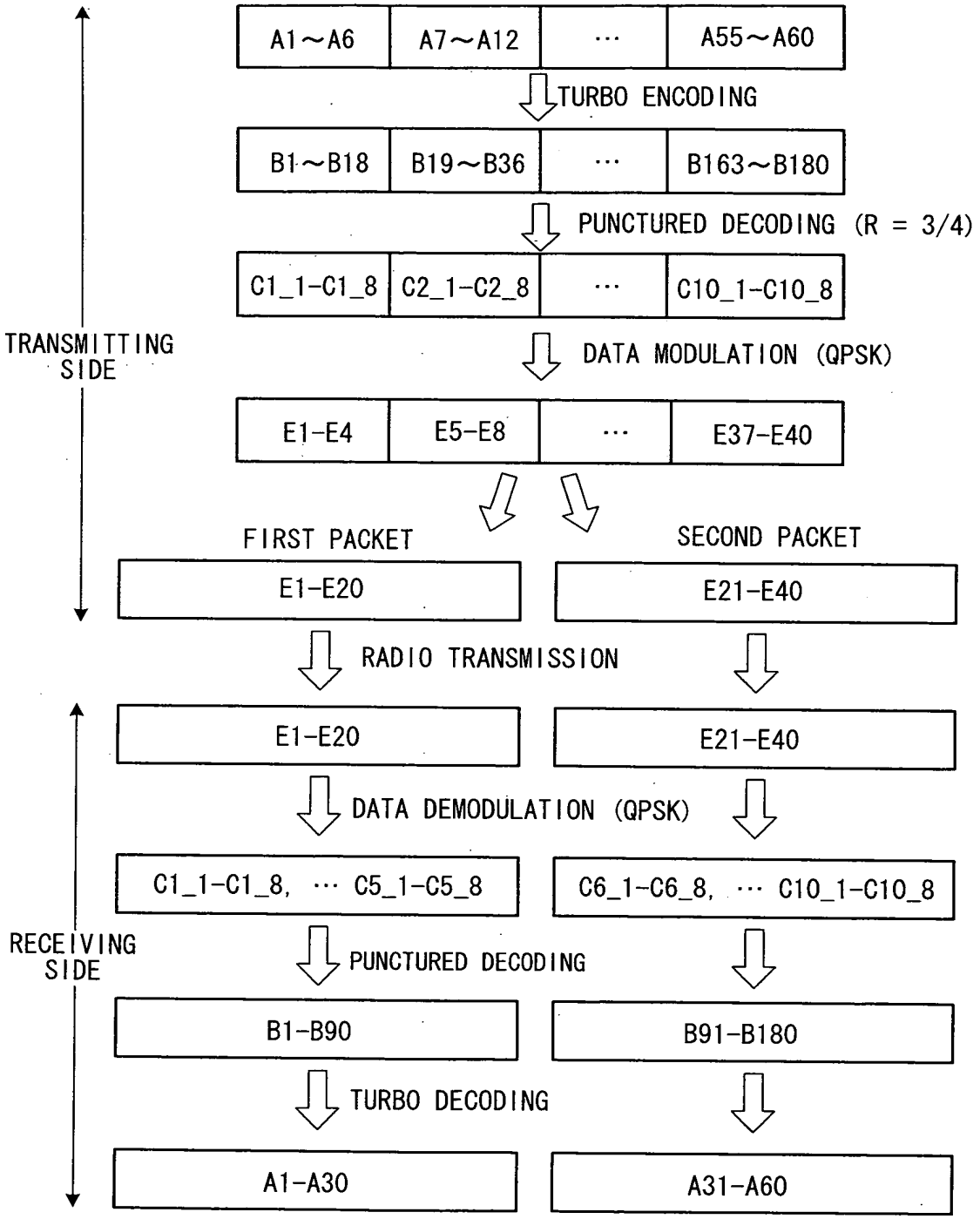
A1～A6
A7～A12
…
A55～A60
TURBO ENCODING
B1～B18
B19～B36
…
B163～B180
PUNCTURED DECODING (R = 3/4)
C1_1-C1_8
C2_1-C2_8
…
C10_1-C10_8
DATA MODULATION (QPSK)
E1-E4
E5-E8
…
E37-E40
TRANSMITTING SIDE
FIRST PACKET
SECOND PACKET
E1-E20
E21-E40
RADIO TRANSMISSION
E1-E20
E21-E40
DATA DEMODULATION (QPSK)
C1_1-C1_8, … C5_1-C5_8
C6_1-C6_8, … C10_1-C10_8
RECEIVING SIDE
PUNCTURED DECODING
B1-B90
B91-B180
TURBO DECODING
A1-A30
A31-A60

FIG. 10

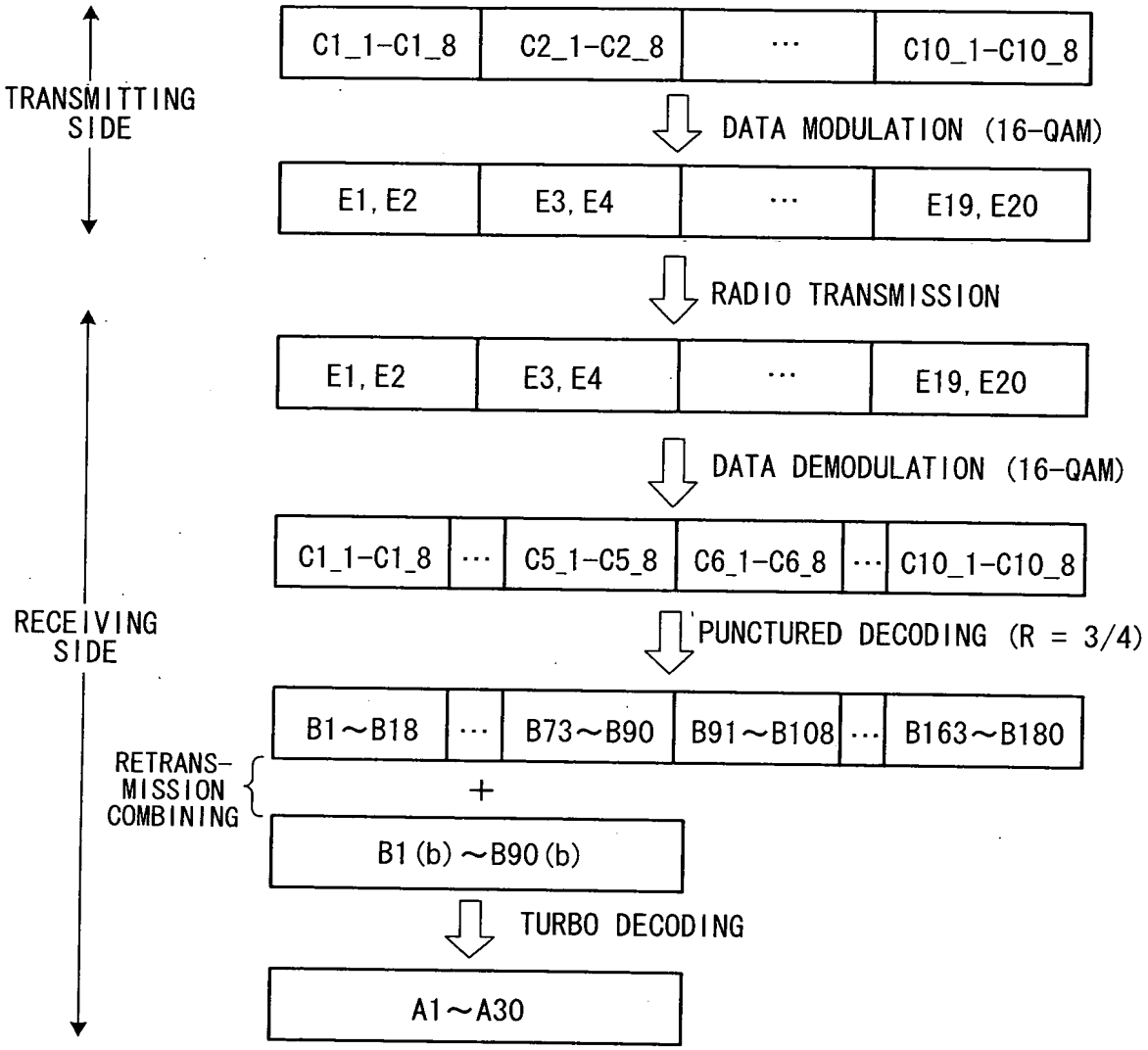
TRANSMITTING SIDE
C1_1-C1_8
C2_1-C2_8
···
C10_1-C10_8
DATA MODULATION (16-QAM)
E1, E2
E3, E4
···
E19, E20
RADIO TRANSMISSION
E1, E2
E3, E4
···
E19, E20
DATA DEMODULATION (16-QAM)
RECEIVING SIDE
C1_1-C1_8
···
C5_1-C5_8
C6_1-C6_8
···
C10_1-C10_8
PUNCTURED DECODING (R = 3/4)
B1～B18
···
B73～B90
B91～B108
···
B163～B180
RETRANS-MISSION COMBINING
+
B1(b)～B90(b)
TURBO DECODING
A1～A30

FIG. 11

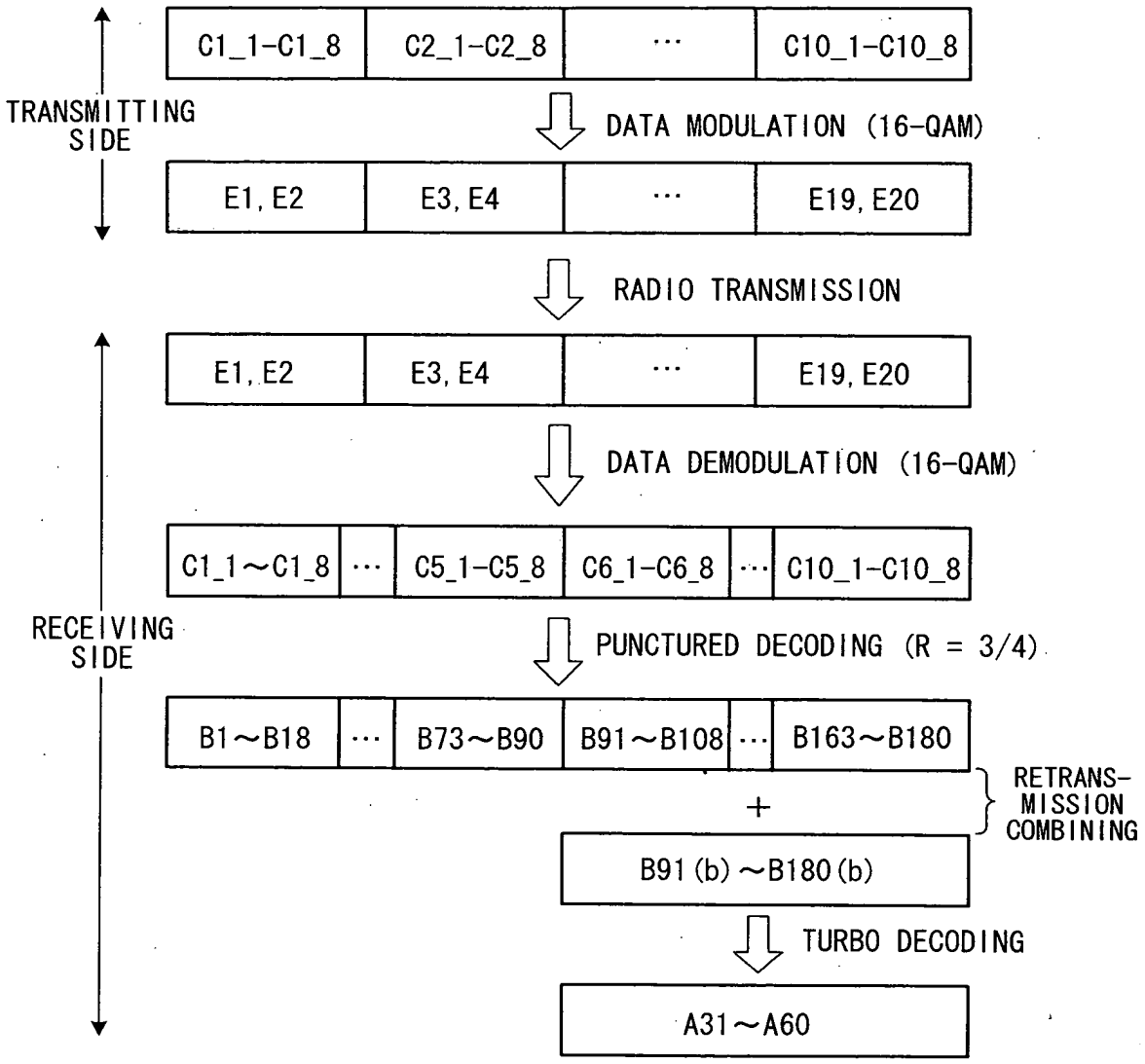
TRANSMITTING SIDE
C1_1-C1_8
C2_1-C2_8
···
C10_1-C10_8
DATA MODULATION (16-QAM)
E1, E2
E3, E4
···
E19, E20
RADIO TRANSMISSION
E1, E2
E3, E4
···
E19, E20
DATA DEMODULATION (16-QAM)
C1_1～C1_8
···
C5_1-C5_8
C6_1-C6_8
···
C10_1-C10_8
RECEIVING SIDE
PUNCTURED DECODING (R = 3/4)
B1～B18
···
B73～B90
B91～B108
···
B163～B180
RETRANS-MISSION COMBINING
+
B91(b)～B180(b)
TURBO DECODING
A31～A60

FIG. 12

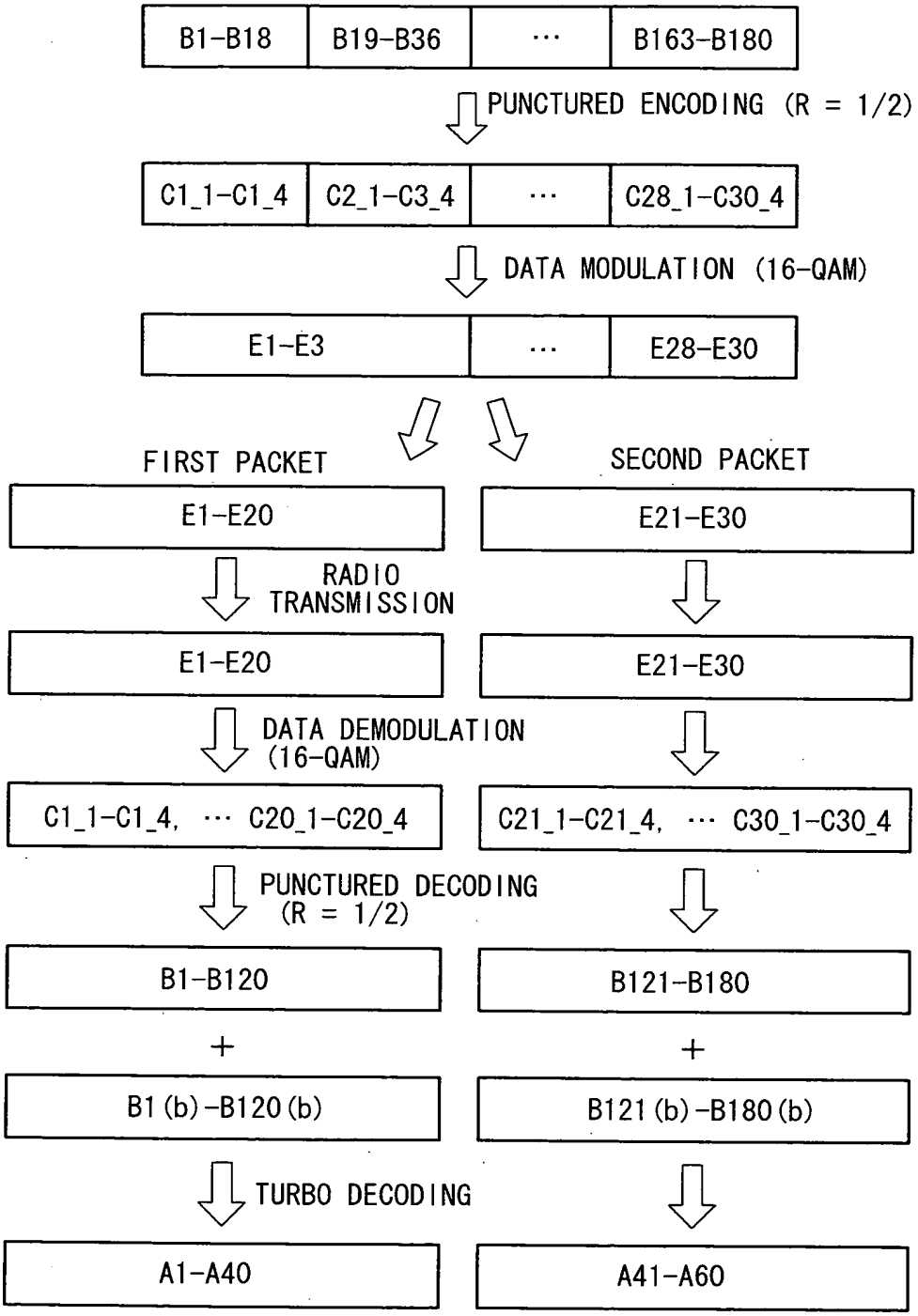
B1-B18
B19-B36
···
B163-B180
PUNCTURED ENCODING (R = 1/2)
C1_1-C1_4
C2_1-C3_4
···
C28_1-C30_4
DATA MODULATION (16-QAM)
E1-E3
···
E28-E30
FIRST PACKET
SECOND PACKET
E1-E20
E21-E30
RADIO TRANSMISSION
E1-E20
E21-E30
DATA DEMODULATION (16-QAM)
C1_1-C1_4, ··· C20_1-C20_4
C21_1-C21_4, ··· C30_1-C30_4
PUNCTURED DECODING (R = 1/2)
B1-B120
B121-B180
+
+
B1(b)-B120(b)
B121(b)-B180(b)
TURBO DECODING
A1-A40
A41-A60

FIG. 13

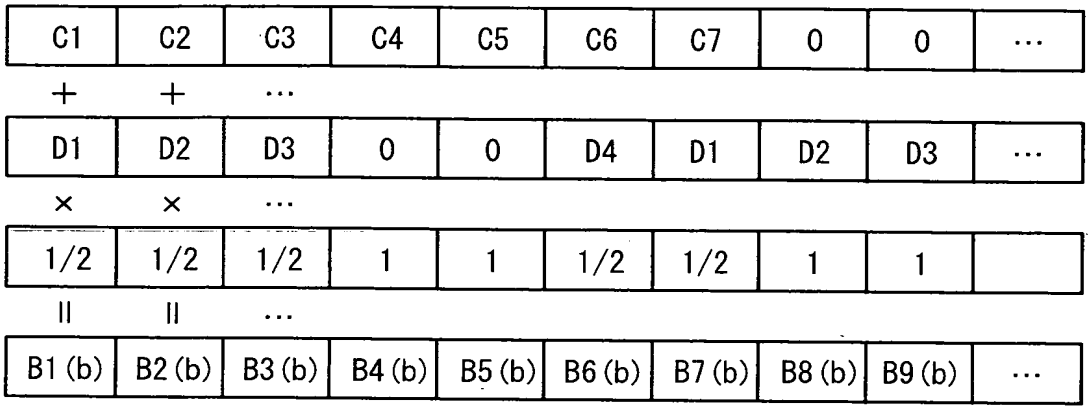
C1 C2 C3 C4 C5 C6 C7 0 0 ⋯
+ + ⋯
D1 D2 D3 0 0 D4 D1 D2 D3 ⋯
× × ⋯
1/2 1/2 1/2 1 1 1/2 1/2 1 1
= = ⋯
B1 (b) B2 (b) B3 (b) B4 (b) B5 (b) B6 (b) B7 (b) B8 (b) B9 (b) ⋯

FIG. 14 PRIOR ART

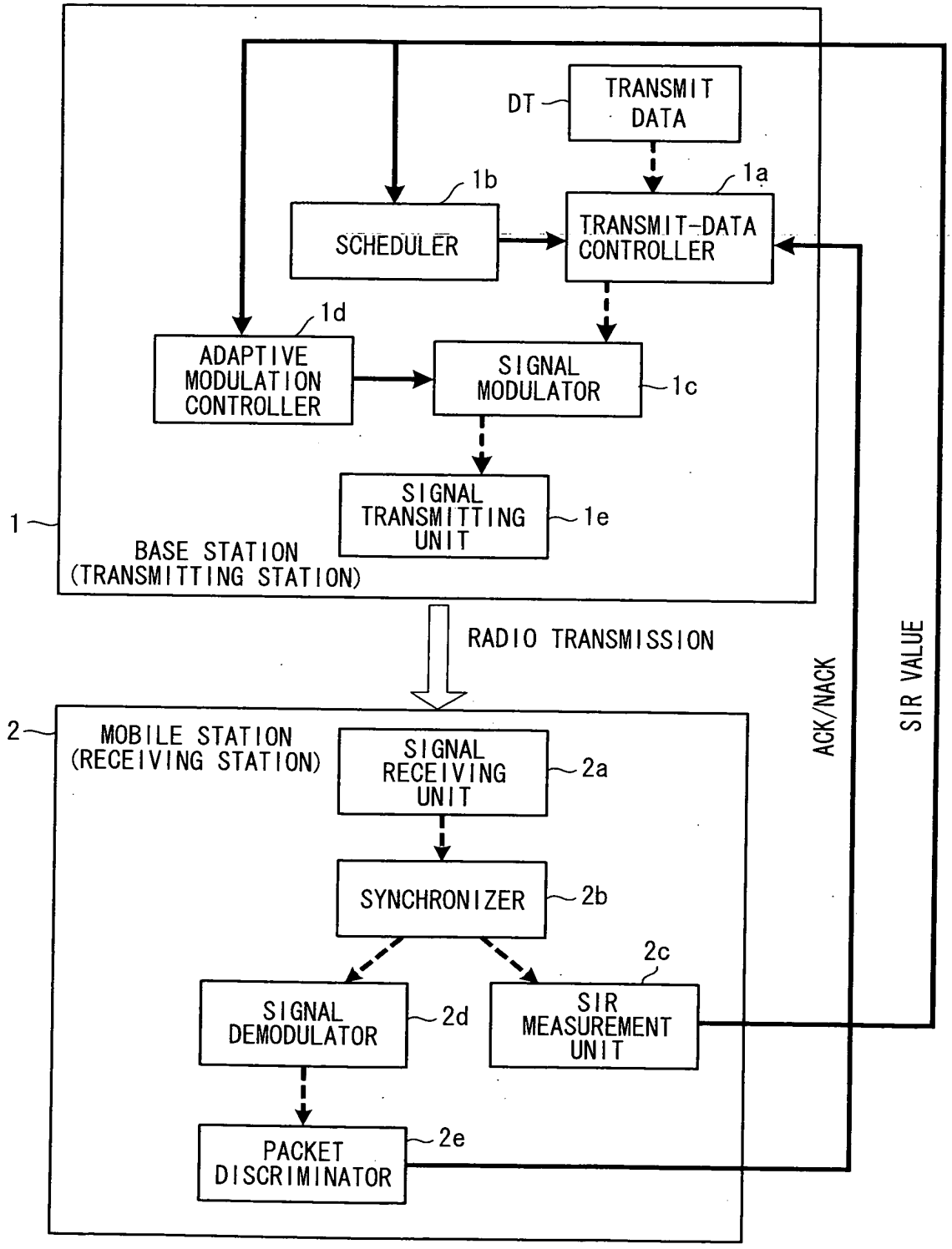

FIG. 15 PRIOR ART

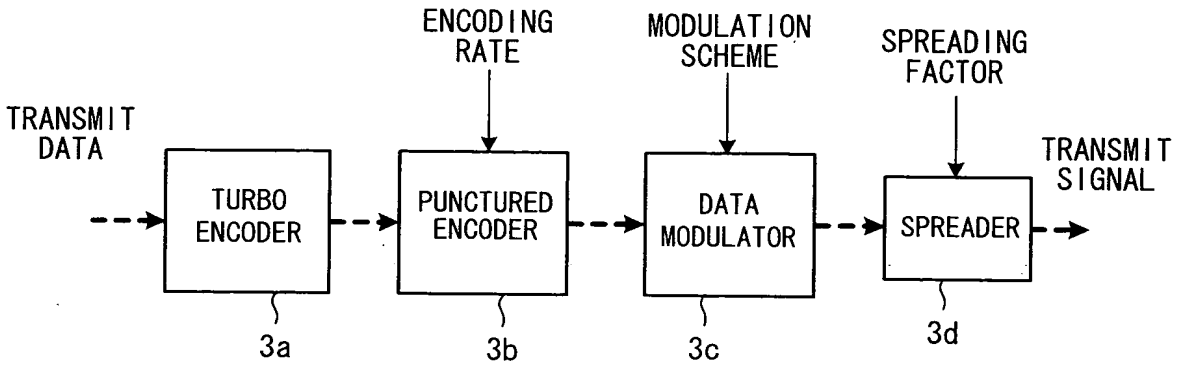

FIG. 16 PRIOR ART

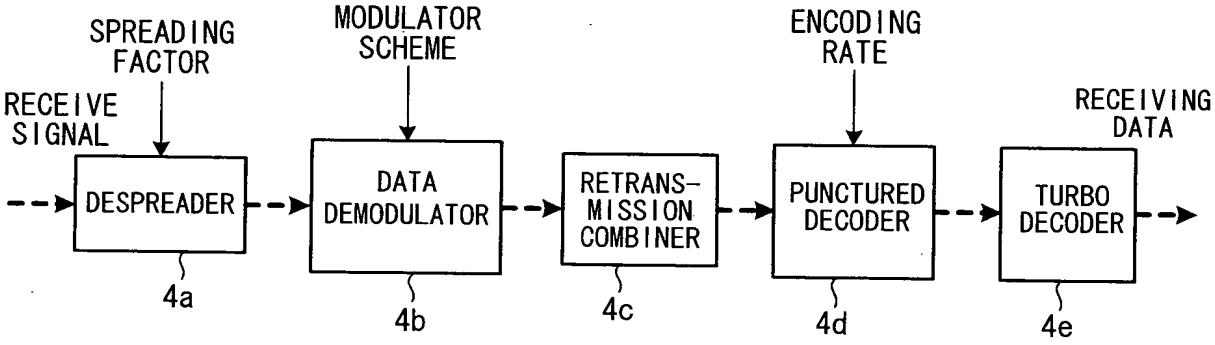

FIG. 17 PRIOR ART

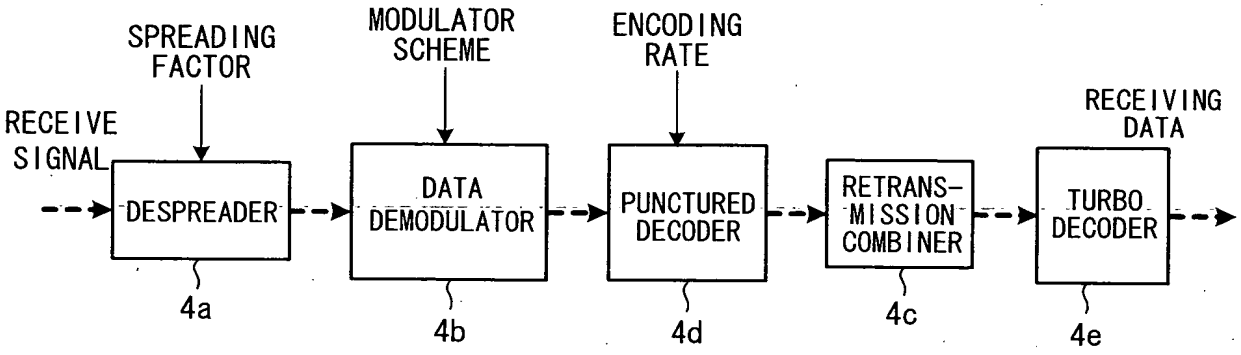

FIG. 18 PRIOR ART

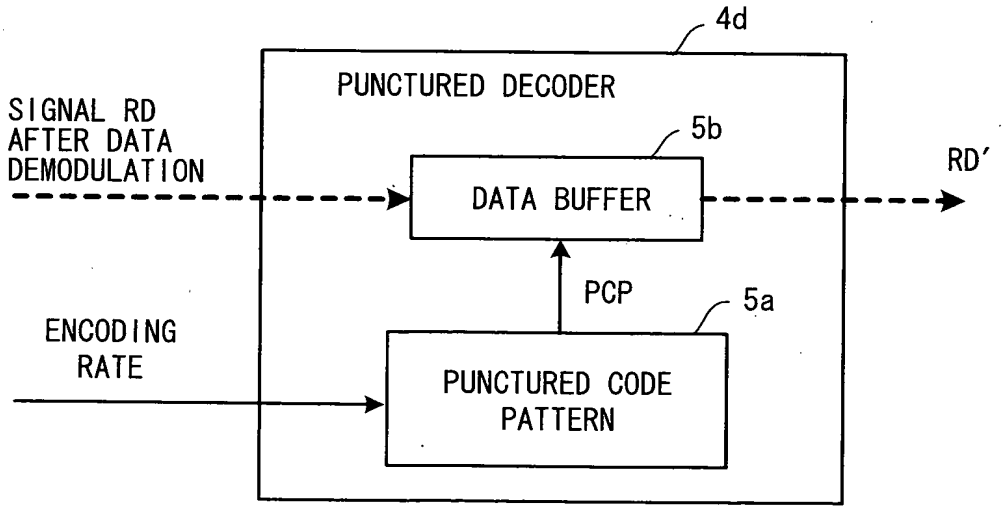

FIG. 19

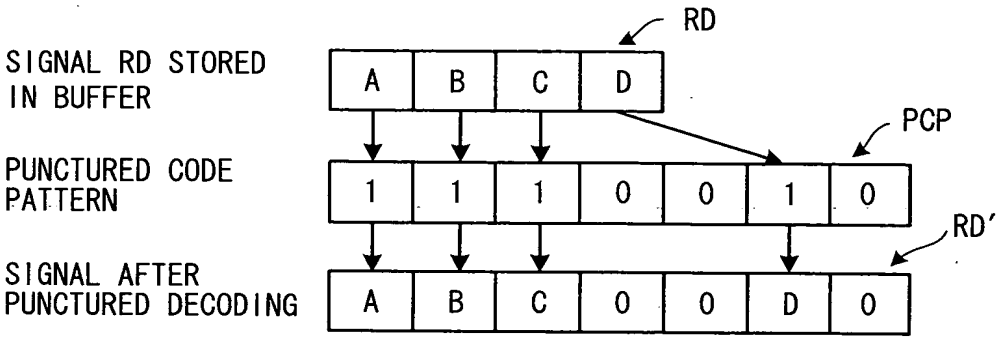
SIGNAL RD STORED IN BUFFER
PUNCTURED CODE PATTERN
SIGNAL AFTER PUNCTURED DECODING
RD
PCP
RD'
A
B
C
D
1
1
1
0
0
1
0
A
B
C
0
0
D
0

FIG. 20 PRIOR ART

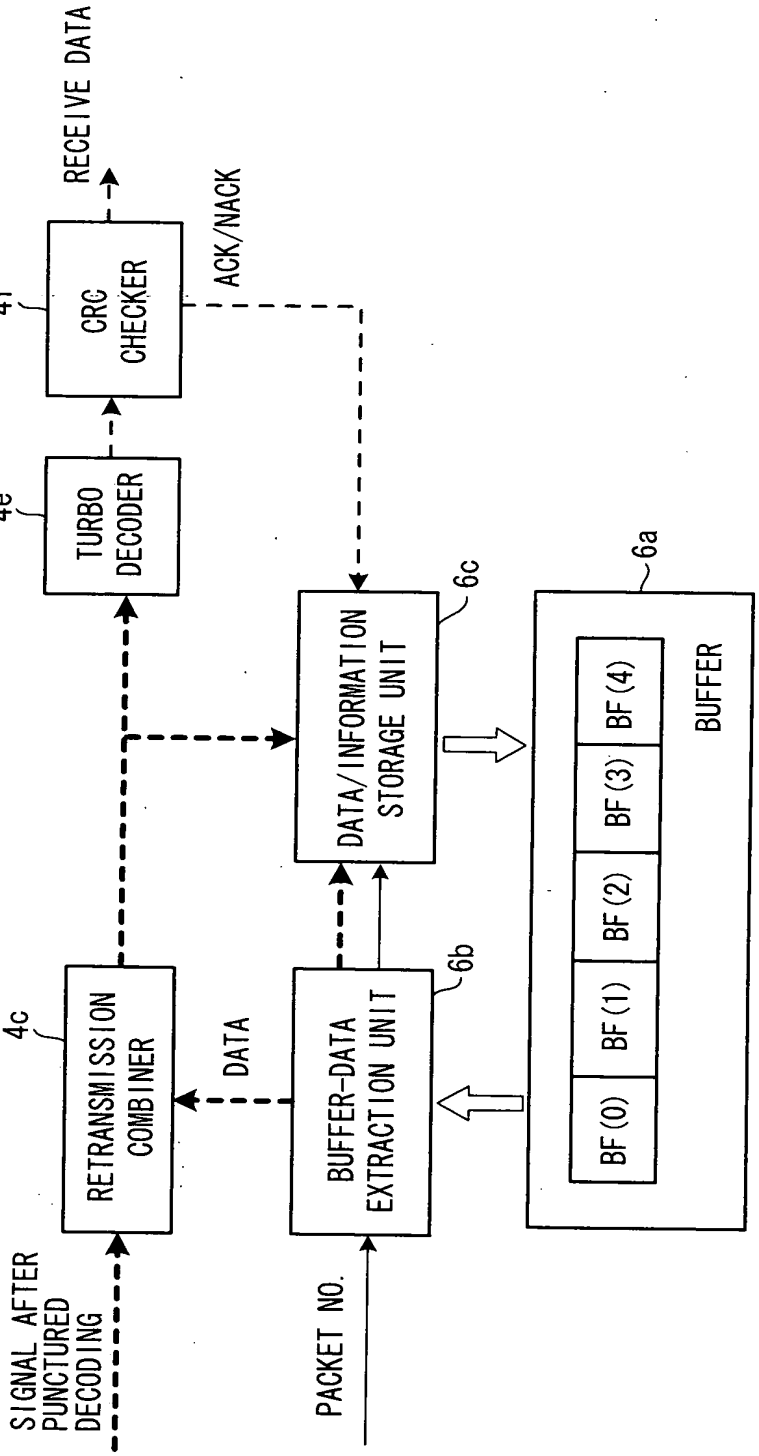

FIG. 21 PRIOR ART

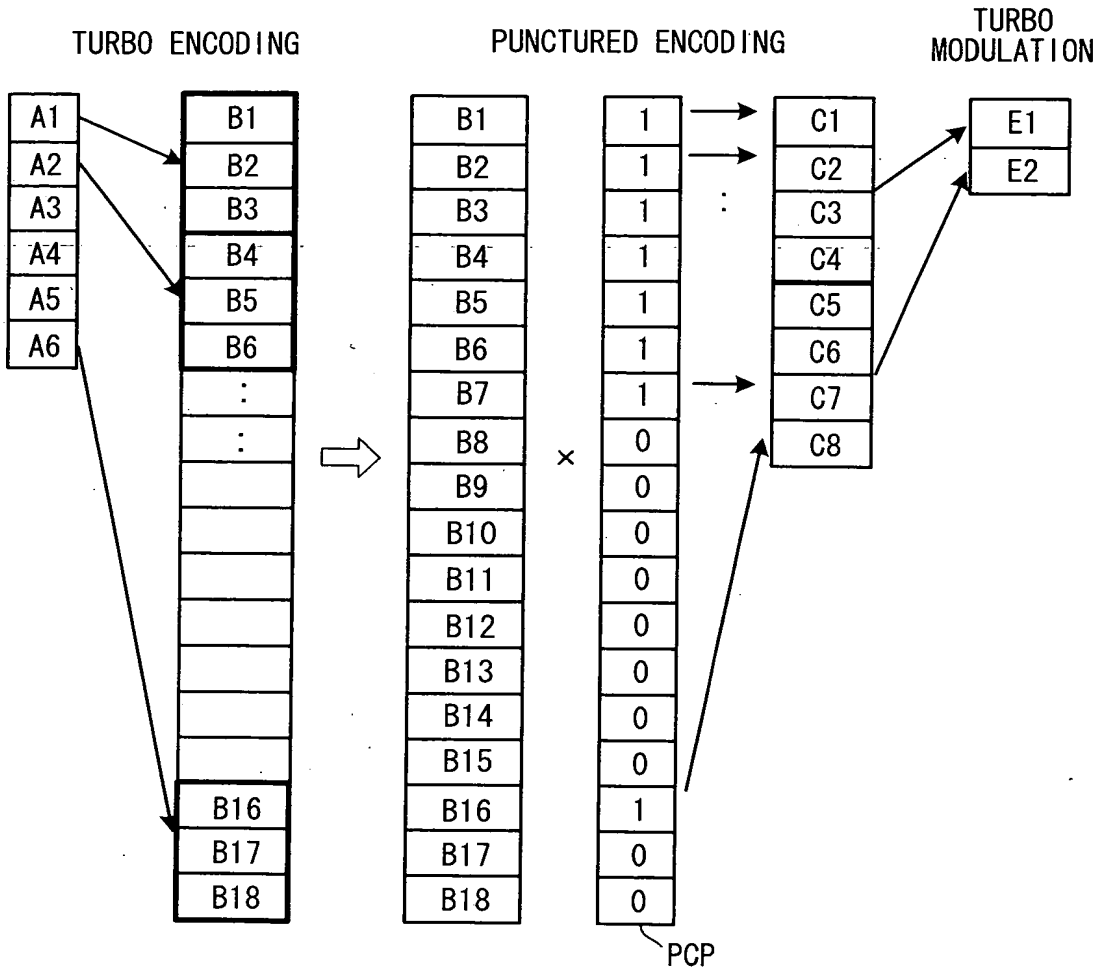

FIG. 22 PRIOR ART

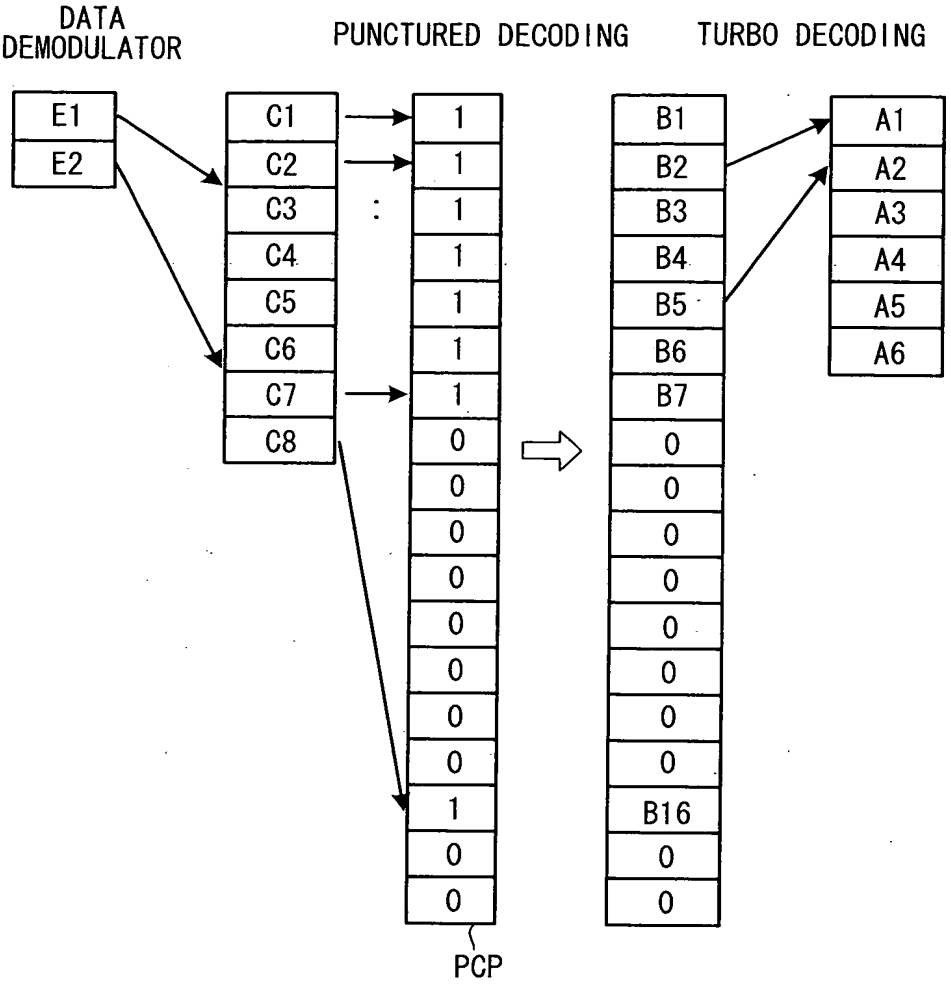

FIG. 23A PRIOR ART

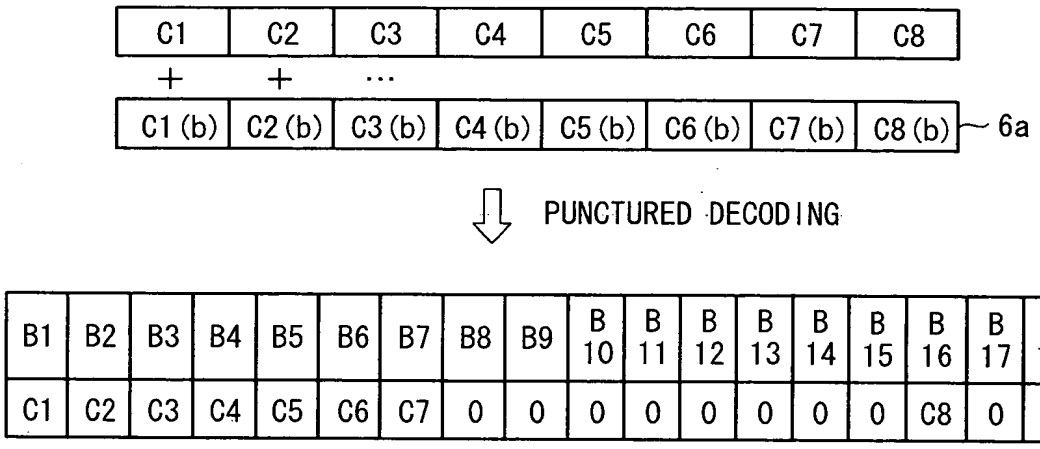

FIG. 23B PRIOR ART

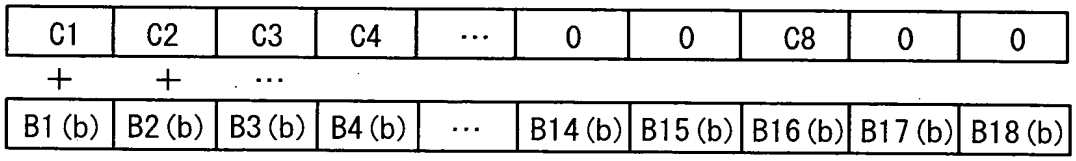

FIG. 24A PRIOR ART

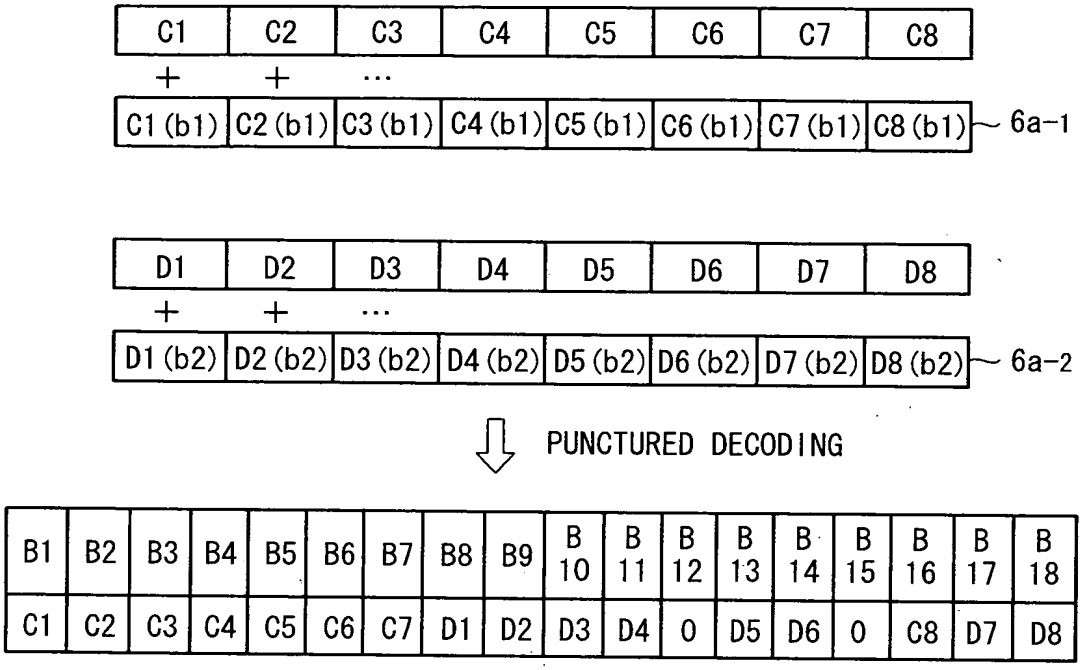

FIG. 24B PRIOR ART

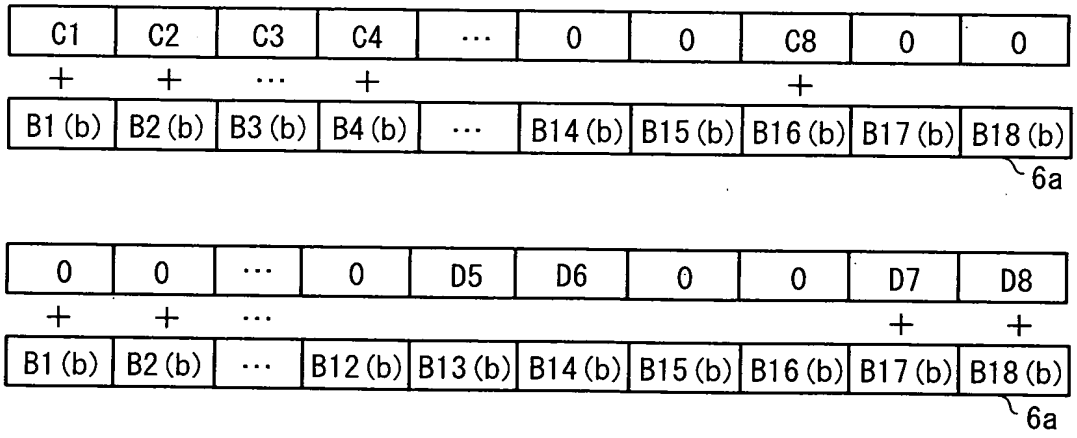
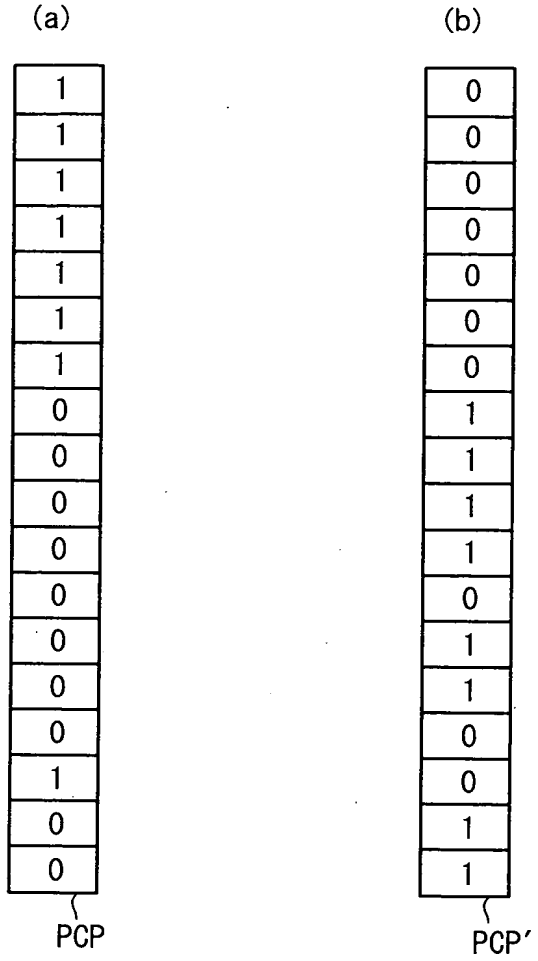
FIG. 25 PRIOR ART